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EXAMINER	
LEUNG, CHRISTINA Y	
ART UNIT	**PAPER NUMBER**
2633	12

DATE MAILED: 03/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/931,111	IMAJO, YOSHIHIRO	
	Examiner	Art Unit	
	Christina Y. Leung	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *12* is/are allowed.

6)☒ Claim(s) *11 and 13-17* is/are rejected.

7)☒ Claim(s) *11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 11 is objected to because of the following informalities:

In claim 11, line 3, the phrase "an inputs" should be changed to "and inputs."

In claim 11, line 5, the word "forth" should be changed to "fourth."

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 11, 13, and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Nagahori et al. (US 5,896,213 A).

Regarding claim 11, Nagahori et al. disclose an optical transmission system (Figure 2) comprising:

a main unit (central office 1) which inputs a first electric signal and outputs a plurality of first optical signals, and inputs a second optical signal and outputs a second electric signal (column 1, lines 34-50);

a plurality of sub units (including ONUs 11 and 12), each of which inputs one of the plurality of first optical signals from the main unit and outputs a third electric signal, and inputs a

fourth electric signal and provides the second optical signal to the main unit (column 1, lines 51-53); and

a plurality of optical fibers (including optical transmission lines 51 and 52), each of which connects the main unit and the plurality of sub units.

Examiner notes that Nagahori et al. disclose that the main unit 1 inputs a first electric signal since it would be well understood in the art that the optical transmitters they disclose (part of elements 71, 72, and 2, for example) would by definition convert first electric input signals into corresponding first optical output signals (in this case, the optical signals output onto fibers 51 and 52 toward the sub units 11 and 12, for example). Likewise, Nagahori et al. disclose that the main unit outputs a second electrical signal since the optical receivers they disclose (part of elements 71, 72, and 2) would by definition convert optical input signals (the "second" optical signals input from fibers 51 and 52, for example) into corresponding second electric output signals.

Furthermore, Nagahori et al. disclose that sub units 11 and 12 each include optical transmitters and receivers and again by definition, the sub units therefore output and input third and fourth electric signals corresponding to the first and second optical signals transmitted bidirectionally on fibers 51 and 52.

Further regarding claim 11, Nagahori et al. disclose that the main unit 1 comprises:

an electro-optical converter (the transmitter portion of one of optical transmitter-receivers 71 or 72, for example) which inputs the first electric signal and converts the first electric signal to a first optical signal;

a coupler unit comprising:

a first optical coupler (splitter 3) which divides the first optical signal into a plurality of first optical signals;

a plurality of input/output ports (the ports connected to the plurality of fibers such as 51 and 52), each of which outputs one of the plurality of first optical signals divided by the first optical coupled to one of the sub units through one of the optical fibers and inputs the second optical signal from one of the sub units through one of the optical fibers;

an output port which outputs the second optical signal (i.e., one of the outputs of the wavelength multiplexing and demultiplexing circuit 7); and

a second optical coupler (i.e., the wavelength multiplexing and demultiplexing circuit 7), provided between the electro-optical converter and the first optical coupler, which provides the first optical signal to the input/output ports and the second optical signal to the output port;

an opto-electric converter (the receiver portion of one of optical transmitter-receivers 71 or 72, for example) which converts the second optical signal output from the output port to a second electric signal; and

an electric signal output terminal which outputs the second electric signal.

Examiner notes that Nagahori et al. do not explicitly show in Figure 2 an electric signal output terminal which outputs the second electric signal. However, Nagahori et al. clearly disclose that the main unit does output a second electric signal via a receiver part of one of the optical transmitter-receiver elements, and it would be well understood that such a receiver would inherently include an electric signal output terminal in order to send that electric signal to further elements in the system so a user can actually receive/interpret the communicated data.

Regarding claim 13, Nagahori et al. disclose that the second optical coupler is provided between the electro-optical converter and the first optical coupler (Figure 2 shows how the second optical coupler 7 is located between the optical transmitter-receiver units 71 and 72 and the splitter 3);

the first optical coupler (splitter 3) further multiplexes a plurality of the second optical signals and provides the second optical signal to the second optical coupler; and

the second optical coupler provides the first optical signal input from the electro-optical converter to the first optical coupler and provides the second optical signal multiplexed by the first optical coupler to the output port.

Examiner notes that the system disclosed by Nagahori et al. is bidirectional, and the second optical coupler 7 provides signals from the transmitters in the central office toward the receivers in the sub units as well as provides signals from the transmitters in the sub units to the receivers in the central office.

Regarding claim 14, Nagahori et al. disclose that the second optical coupler 7 is a wavelength division multiplex optical coupler that selects an optical signal, a wavelength of which has a prescribed relationship with a wavelength of the second optical coupler and outputs the selected optical signal to the output port. The wavelength multiplexing and demultiplexing circuit 7 disclosed by Nagahori et al. demultiplexes a multiplexed optical signal and would therefore select an optical signal of a selected wavelength to an output port and one of the transmitter-receiver elements 71 or 72, for example.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagahori et al. in view of Ishikawa (US 5,936,753 A) and Takagi (US 5,159,479 A).

Regarding claim 15, Nagahori et al. disclose that the sub unit (ONU 11, for example) further comprises:

a sub unit input/output terminal (i.e., the port connecting the fiber51 to the ONU 11) into which inputs the first optical signal from the main unit through the optical fiber;

an opto-electric converter (the transmitter part of optical transmitter-receiver 31 or 41, for example) which inputs the first optical signal and converts the first optical signal to the third electric signal; and

an electro-optical converter (the receiver part of optical transmitter-receiver 31 or 41, for example) which converts the fourth electric signal to the second optical signal.

Nagahori et al. do not explicitly disclose a wavelength division multiplex optical coupler in the sub unit, but they do disclose that the optical transmitter-receiver 41 in the sub unit may process wavelength division multiplexed signals. Furthermore, wavelength division multiplexing is generally well known in the art as a way to distinguish between multiple signals sharing the same transmission line, and Ishikawa in particular teaches a sub unit (Figure 1, element 200(1)) in a similar optical communication system, including a wavelength division multiplexer for

providing a first optical signal from a fiber 36(1) to an opto-electric converter 38 and for providing a second optical signal from the sub unit to the fiber.

It would have been obvious to a person of ordinary skill in the art to specifically include a wavelength division multiplexing coupler as taught by Ishikawa in the sub unit of the system disclosed by Nagahori et al. as a way to properly separate the incoming and outgoing signals that share the optical fiber. Again, Nagahori et al. already disclose that the sub unit may process wavelength division multiplexed signals, and one in the art would have been particularly motivated to combine the coupler taught by Ishikawa with the sub unit disclosed by Nagahori et al. simply in order to properly recover the multiplexed signals.

Further regarding claim 15, Nagahori et al. disclose that electrical signals are input to and output from the sub units (since the optical transmitter-receiver elements located in the sub units necessarily convert electric signals into optical ones and vice versa), but they do not specifically disclose an antenna. However, it is well known in the art that antennas may be used to communicate electrical signals between remote units, and Takagi specifically teaches that electric signals converted from optical ones may be further transmitted to other elements via an antenna (Figure 2). Takagi also teaches that an antenna may be used to receive an electric signal, which is then converted into an optical signal. It would have been obvious to a person of ordinary skill in the art to provide an antenna as taught by Takagi in the system disclosed by Nagahori et al. as a way to further transmit the electrical signals to and from the electrical domain in the system. One in the art would have been particularly motivated to include antennas in order to extend the range of the communications across different types of devices (i.e., such as known wireless radio-frequency devices) as suggested by Takagi.

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagahori et al. in view of Korkowski et al. (US 5,432,875 A).

Regarding claim 16, Nagahori et al. do not specifically disclose that each of the input/output ports and the output port has an optical connector adapter that detachably mounts an optical fiber. However, Nagahori et al. do disclose the use of optical fiber to connect elements in their system, and it is common knowledge in the art that optical connectors may be used to properly attach optical signal ports to fibers, as Korkowski et al. in particular illustrates (Figures 1 and 2; column 1, lines 11-40). It would have been obvious to a person of ordinary skill in the art to include well known connector adaptors such as shown by Korkowski et al. in the ports of the system disclosed by Naghori et al. simply in order to provide a secure connection between the fiber and elements in the system. One in the art would have been particularly motivated to provide such connector adaptors in the system disclosed by Nagahori et al. in order to allow the elements to be easily detached or reattached as necessary in the event of an equipment failure.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagahori et al. in view of Li (US 5,926,298 A).

Regarding claim 17, Nagahori et al. do not specifically disclose that the coupler unit is constituted monolithically on a circuit board. However, integrated optical couplers are well known in the art, and Li in particular teach several embodiments of integrated coupler units similar to the one already disclosed by Nagahori et al., including first and second optical couplers and input and output ports (Figures 6 and 7, for example). It would have been obvious to a person of ordinary skill in the art to provide a coupler unit constituted monolithically on a

circuit board such as taught by Li as the coupler unit already disclosed by Nagahori et al. in order to manufacture the unit more compactly and at a low cost (Li, column 3, lines 54-65).

Allowable Subject Matter

8. Claim 12 is allowed.

Response to Arguments

9. Applicant's arguments with respect to claims 11 and 13-16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 703-605-1186. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

JASON CHAN
SUPERVISORY PATENT EXAMINER
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